UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

March 28, 1995 AT-18J

VIA FACSIMILE

Mr. Richard Berggreen
STS Consultants, Ltd.
111 Pfingsten Road
Northbrook, Illinois 60062

RE: Review of "Draft Report for Characterization Investigation Gamma Radiation Survey, Lindsay Light II Site, November 18, 1994"

Dear Mr. Berggreen:

I have reviewed the above document and have the following comments.

GENERAL COMMENTS

1. Laboratory results presented in this document appear to be in error. Radionuclides associated with nuclear power plants are identified while radionuclides associated with environmental soil samples were not reported.

2. Laboratory results do not indicate equilibrium where it would normally be expected. There is no discussion nor explanation of this condition in the text.

3. STS set a second criteria for investigation areas, in addition to the one advocated by EPA. The second criteria should be dropped to eliminated the unnecessary confusion about background thresholds.

SPECIFIC COMMENTS

1. **Scope of Work, page 8, Table 1**--Down-hole gamma logs for 157E 49N and 17E 59N are included with the tracings in the appendix but are not referenced in this table, nor are they shown on the engineering drawing, Figure 3-1.

2. **Scope of Work, page 10**--It would be helpful to include the individual concentrations of Th-232 and Ra-226 in the calibration drums since these are distinct radionuclides with distinct qualities.

3. **Scope of Work, page 11, para. 3**--Boring results for 156E 48N have not been included in figures for down-hole gamma logs.

4. **Investigation Results, page 18, Section 3.1.1**--The use of two background thresholds introduces unnecessary confusion about where contamination may be located. While the use of a higher threshold may reduce the apparent affected area, it should be noted that gamma measurements traditionally underestimate soil volumes by factors as large as 2 to 3, largely due to shielding by overly soil. Investigation of potential contamination should be based upon a positive response with either criteria.

5. **Investigation Results, page 22, bullets**--Two background thresholds are puzzling and introduce unnecessary confusion.

6. **Investigation Results, page 24, last para.**--The presence of conflicting evidence should make this location an area of further investigation, especially since it is near the Parking Attendant Booth.

7. **Investigation Results, page 27, para. 5**--171E 64N should be listed as an anomalous area requiring further investigation.

8. **Investigation Results, page 32, para. 2**--It is very unclear how soil concentrations can be well estimated when the basis for the estimate is the combined Th-232 + Ra-226 gamma count rate. It appears there is an assumption of a fixed ratio between Th-232 and Ra-226 at the Lindsay Light II site, based upon a ratio set at the Kerr-McGee Chemical site. This needs confirmation before reliable interpolations can be made.

9. **Investigation Results, 32, para. 4**--This statement is not supported by the data in Table 4. Laboratory data presented in Table 4 indicate some high K-40 and fission products as well. Fission products are likely to have been misidentified.

10. **Table 4**--The radionuclides in the Thorium Decay Series do not appear to be in equilibrium. This should not be the case when thorium has been undisturbed for several decades. Clarify whether this condition is due to laboratory inaccuracies or whether there is another explanation.

11. **Table 5**--Clarify whether the duplicate of sample 5179-001 is a field duplicate, a lab duplicate or a lab replicate.

    Explain why sample 5179-001 and its duplicate fail to agree numerically.

    Explain why U-238 and U-234 are not in equilibrium.

12. **Table 6**--Explain why Th-232 and Th-228 are out of equilibrium.

    Looking back to Table 5, explain why U-238, U-234 and Th-230 are not in equilibrium.

From the data in Tables 4, 5 and 6, there are not numerical consistencies between radionuclides that we would expect to be consistent (in equilibrium). Clarify whether this is a laboratory problem or whether there is another explanation.

13. **Engineering Drawing, Figure 2-1**--There is a shortage of 1 meter grid areas on this drawing compared to Figure 3-1.

    The sites for background gamma readings are not shown on any figure.

14. **Engineering Drawing, Figure 3-1**--The irregular 1 meter grid areas on this map do not coincide with the regular areas on Figures 3-2 to 3-13A.

15. **Figures 3-2 to 3-13A**--The notation Bkg + 2 Std Dev - 10 x Bkg is confusing. It could be read either as a range or as an equation.

16. **Figures 3-5, 3-6, 3-7, 3-9, 3-10a, 3-13**--Contamination appears to go beyond the grid boundary. This should be discussed in the text.

17. **Figures 3-6 and 3-6a**--Background is given as 2484 cpm in both these figures, but the regions designated as > 10 Bkg are different, both in number and extent. This should be clarified.

18. **Figures 3-7 and 3-7a**--It appears that the red shaded areas should be designated as 10 Bkg - 20 Bkg not >10 Bkg - 20 Bkg.

    Although > 10 Bkg - 20 Bkg is the same numerically in both these figures the size and extent of the red areas are different.

    There is no > 20 Bkg area on Figure 3-7a.

19. **Figures 3-9 and 3-9a**--Although > 10 Bkg - 20 Bkg is the same numerically in both these figures the size and extent of the red areas are different.

    Figure 3-9 shows a green area (> 20 Bkg) while Figure 3-9a does not.

20. **Figure 3-10**--My binder is missing this figure.

21. **Figures 3-13 and 3-13a**--It appears that the red shaded area should be designated 10 Bkg - 20 Bkg not >10 Bkg - 20 Bkg.

    Although > 10 Bkg - 20 Bkg is the same numerically in both these figures the size and extent of the red areas are different.

22. **Engineering Drawings**--The Engineering Drawings and the contamination maps are both labeled with the same figure numbers. This is confusing.

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